To our customers,

Old Company Name in Catalogs and Other Documents

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Renesas Electronics website: http://www.renesas.com

April 1st, 2010
Renesas Electronics Corporation

EOL announced Product

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EOL announced product

RENESAS

MOS FIELD EFFECT TRANSISTOR

2SK3510

SWITCHING
N-CHANNEL POWER MOS FET

EOL announced Product

DESCRIPTION

The 2SK3510 is N-channel MOS Field Effect Transistor designed for high current switching applications.

FEATURES

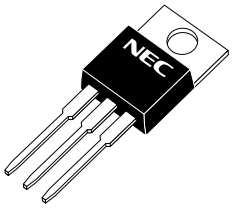
- Super low on-state resistance:
  $R_{DS(on)}$ = 8.5 mΩ MAX. (V_{GS} = 10 V, I_D = 42 A)
- Low C_{iss}: C_{iss} = 8500 pF TYP.
- Built-in gate protection diode

ORDERING INFORMATION

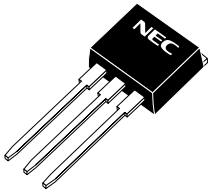
PART NUMBER	PACKAGE
2SK3510	TO-220AB
2SK3510-S	TO-262
2SK3510-ZJ	TO-263
2SK3510-Z	TO-220SMD[Note]

Note TO-220SMD package is produced only in Japan.

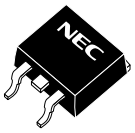
(TO-220AB)



(TO-262)



(TO-263, TO-220SMD)



ABSOLUTE MAXIMUM RATINGS (T_A = 25°C)

Drain to Source Voltage (V_{GS} = 0 V)	V_{DSS}	75	V
Gate to Source Voltage (V_{DS} = 0 V)	V_{GSS}	±20	V
Drain Current (DC) (T_C = 25°C)	$I_{D(DC)}$	±83	A
Drain Current (pulse) [Note1]	$I_{D(pulse)}$	±332	A
Total Power Dissipation (T_C = 25°C)	P_{T1}	125	W
Total Power Dissipation (T_A = 25°C)	P_{T2}	1.5	W
Channel Temperature	T_{ch}	150	°C
Storage Temperature	T_{stg}	–55 to +150	°C
Single Avalanche Current [Note2]	I_{AS}	69	A
Single Avalanche Energy [Note2]	E_{AS}	450	mJ

Notes 1. PW ≤ 10 μs, Duty Cycle ≤ 1%

2. Starting T_{ch} = 25°C, V_{DD} = 35 V, R_G = 25 Ω, V_{GS} = 20 → 0 V

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Printed in Japan

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ELECTRICAL CHARACTERISTICS (T_A = 25°C)

CHARACTERISTICS	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNIT
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = 75 V, V_{GS} = 0 V			10	μA
Gate Leakage Current	I_{GSS}	V_{GS} = ±20 V, V_{DS} = 0 V			±10	μA
Gate Cut-off Voltage	$V_{GS(off)}$	V_{DS} = 10 V, I_D = 1 mA	2.0	3.0	4.0	V
Forward Transfer Admittance	$\|y_{fs}\|$	V_{DS} = 10 V, I_D = 42 A	30	60		S
Drain to Source On-state Resistance	$R_{DS(on)}$	V_{GS} = 10 V, I_D = 42 A		6.5	8.5	mΩ
Input Capacitance	C_{iss}	V_{DS} = 10 V		8500		pF
Output Capacitance	C_{oss}	V_{GS} = 0 V		1300		pF
Reverse Transfer Capacitance	C_{rss}	f = 1 MHz		650		pF
Turn-on Delay Time	$t_{d(on)}$	V_{DD} = 38 V, I_D = 42 A		35		ns
Rise Time	t_r	V_{GS} = 10 V		28		ns
Turn-off Delay Time	$t_{d(off)}$	R_G = 0 Ω		105		ns
Fall Time	t_f			16		ns
Total Gate Charge	Q_G	V_{DD} = 60 V		150		nC
Gate to Source Charge	Q_{GS}	V_{GS} = 10 V		30		nC
Gate to Drain Charge	Q_{GD}	I_D = 83 A		52		nC
Body Diode Forward Voltage	$V_{F(S-D)}$	I_F = 83 A, V_{GS} = 0 V		1.0		V
Reverse Recovery Time	t_{rr}	I_F = 83 A, V_{GS} = 0 V		80		ns
Reverse Recovery Charge	Q_{rr}	di/dt = 100 A/μs		240		nC

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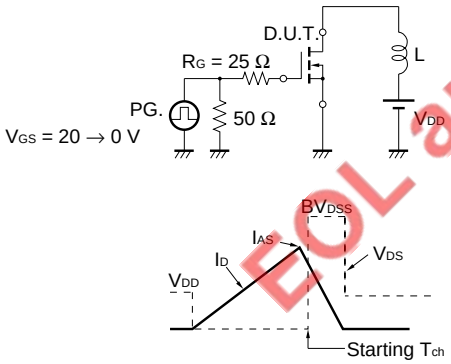
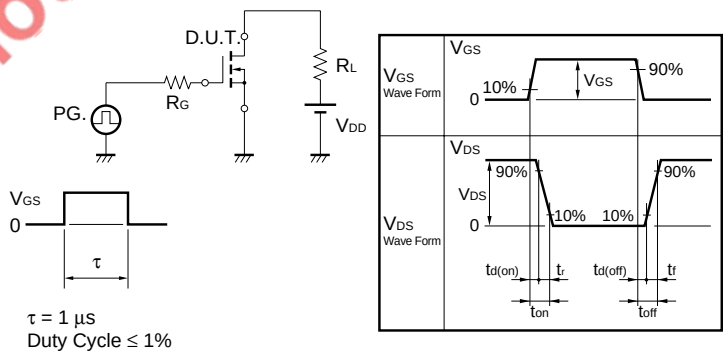
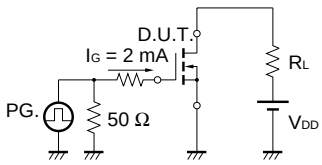
TEST CIRCUIT 1 AVALANCHE CAPABILITY



TEST CIRCUIT 2 SWITCHING TIME

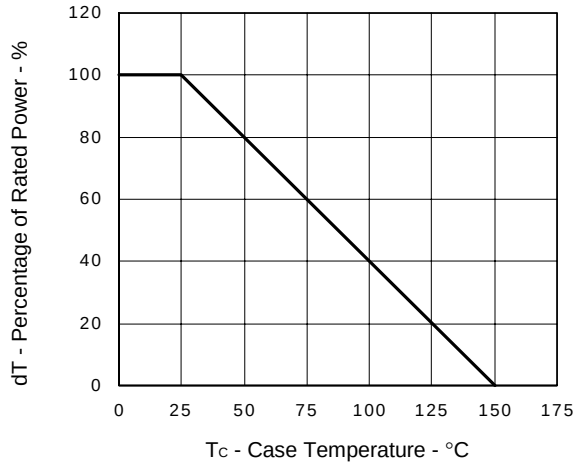


TEST CIRCUIT 3 GATE CHARGE

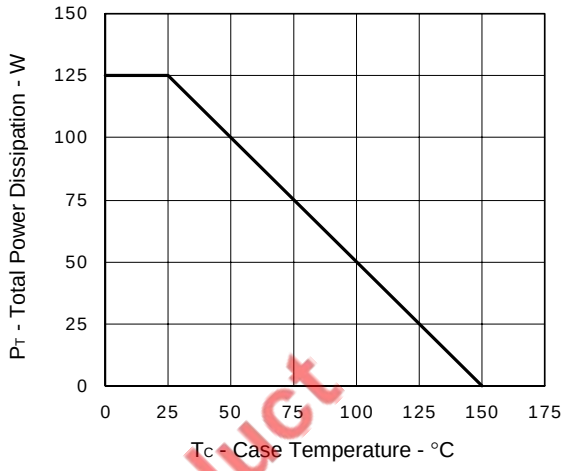


TYPICAL CHARACTERISTICS (T_A = 25°C)

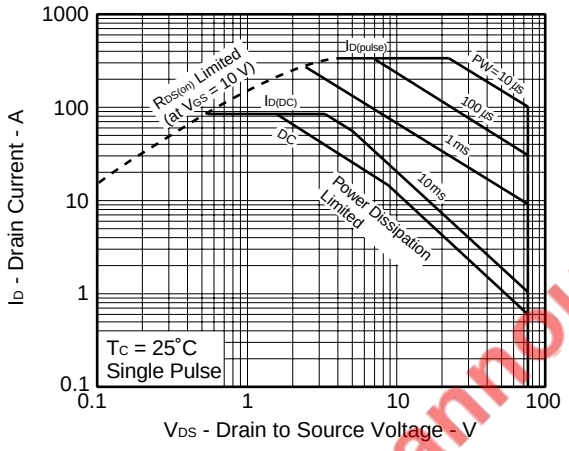
DERATING FACTOR OF FORWARD BIAS SAFE OPERATING AREA



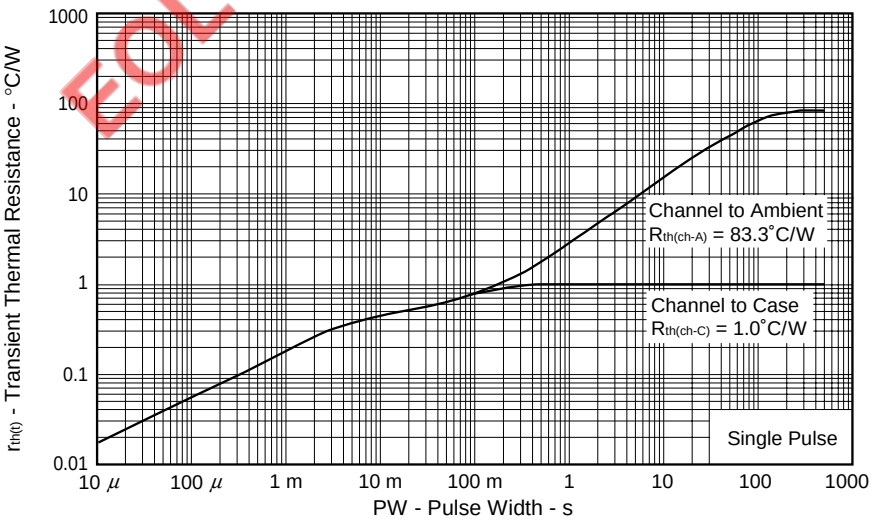
TOTAL POWER DISSIPATION vs. CASE TEMPERATURE



FORWARD BIAS SAFE OPERATING AREA



TRANSIENT THERMAL RESISTANCE vs. PULSE WIDTH



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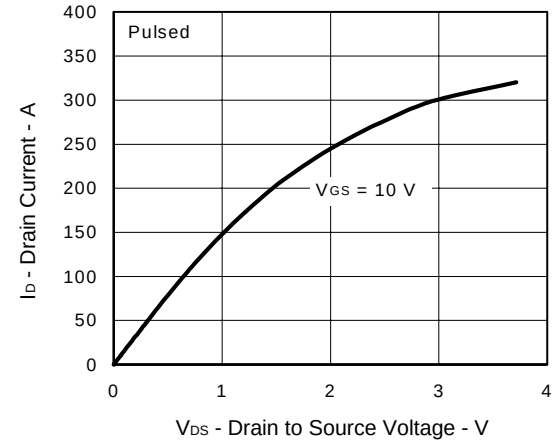
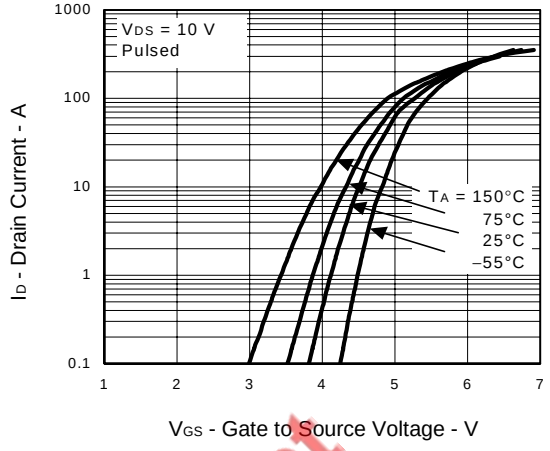
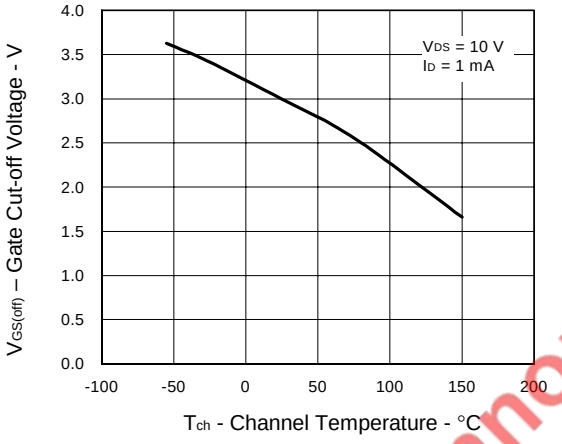
DRAIN CURRENT vs.
DRAIN TO SOURCE VOLTAGE



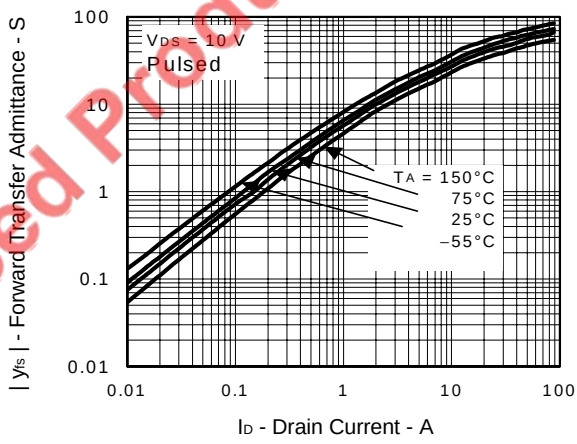
FORWARD TRANSFER CHARACTERISTICS



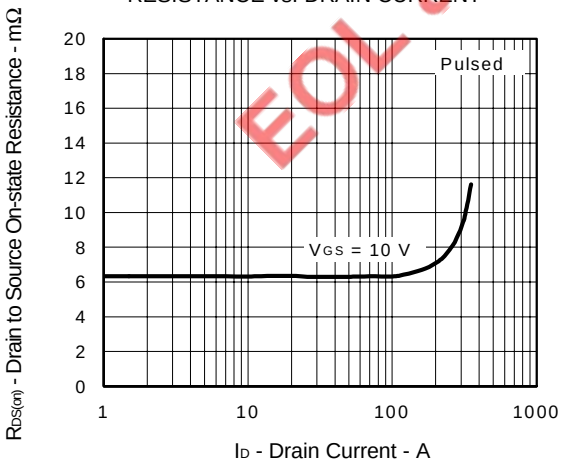
GATE CUT-OFF VOLTAGE vs.
CHANNEL TEMPERATURE



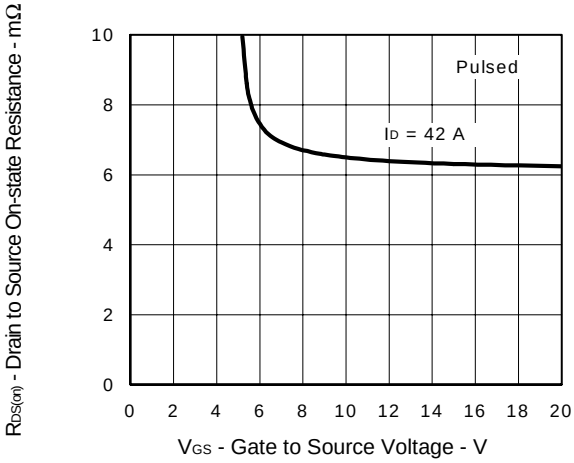
FORWARD TRANSFER ADMITTANCE vs.
DRAIN CURRENT



DRAIN TO SOURCE ON-STATE
RESISTANCE vs. DRAIN CURRENT



DRAIN TO SOURCE ON-STATE RESISTANCE vs.
GATE TO SOURCE VOLTAGE



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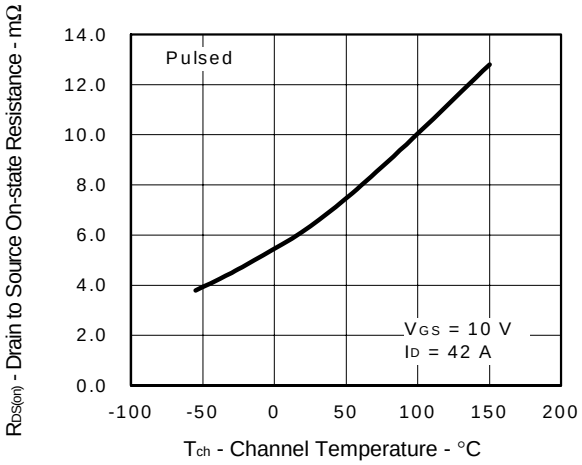
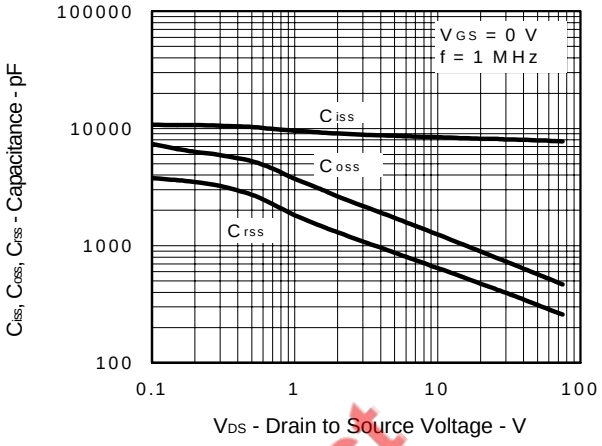
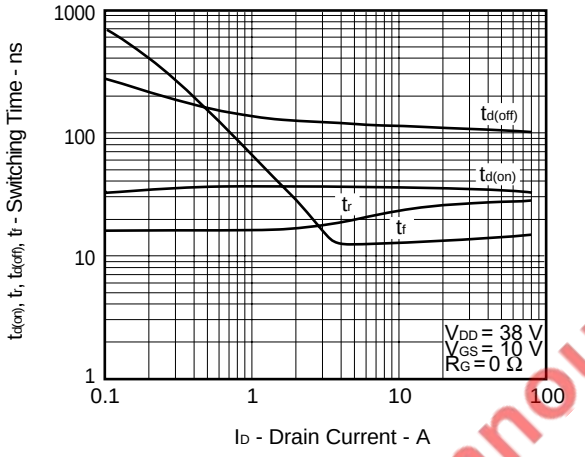
DRAIN TO SOURCE ON-STATE RESISTANCE vs.
CHANNEL TEMPERATURE



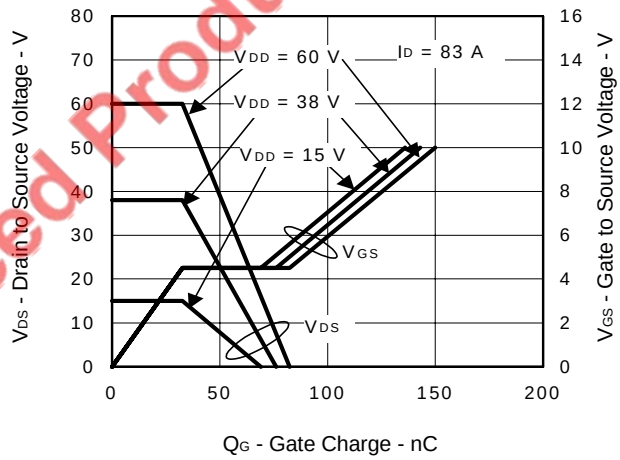
CAPACITANCE vs.
DRAIN TO SOURCE VOLTAGE



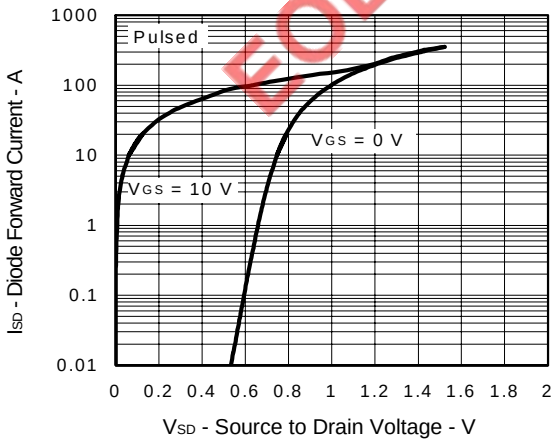
SWITCHING CHARACTERISTICS



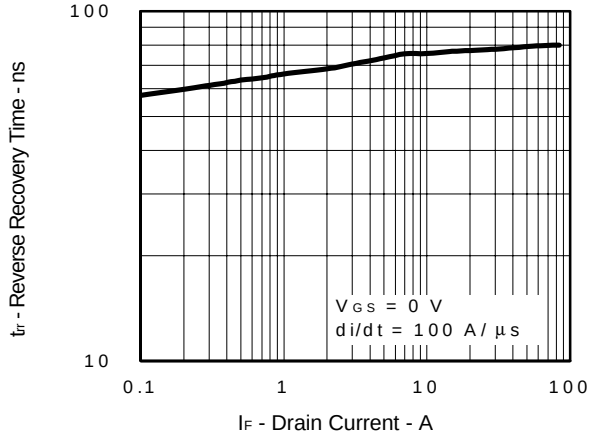
DYNAMIC INPUT/OUTPUT CHARACTERISTICS



SOURCE TO DRAIN DIODE
FORWARD VOLTAGE



REVERSE RECOVERY TIME vs. DRAIN CURRENT



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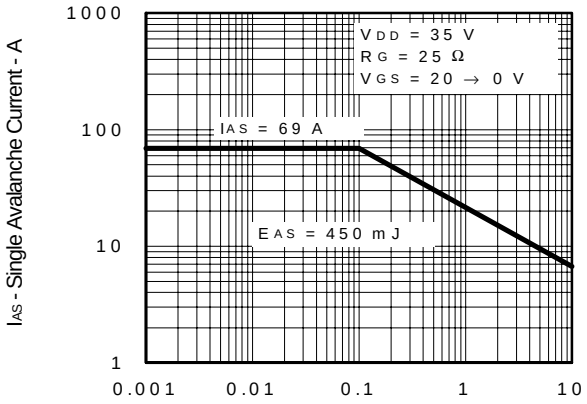
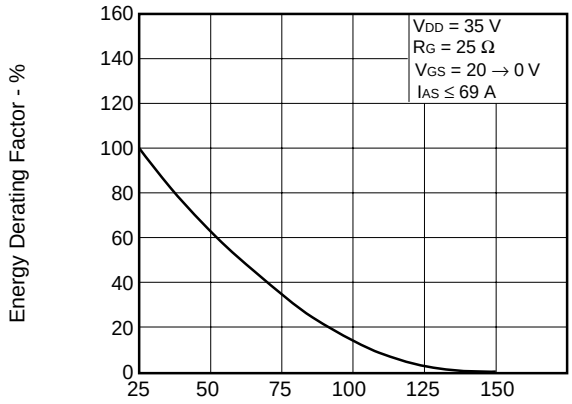
SINGLE AVALANCHE CURRENT vs.
INDUCTIVE LOAD



SINGLE AVALANCHE ENERGY
DERATING FACTOR



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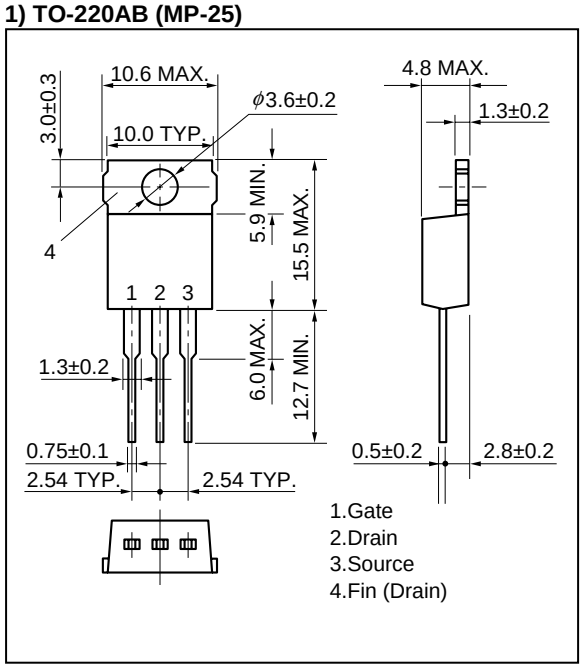
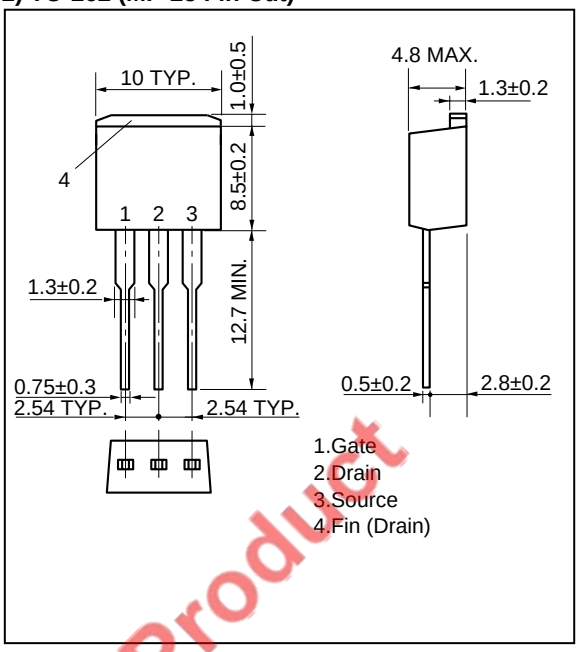
PACKAGE DRAWINGS (Unit: mm)

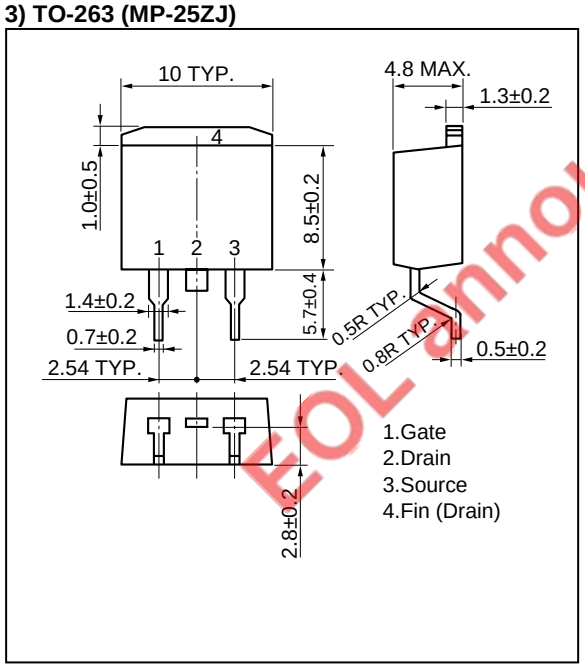
1) TO-220AB (MP-25)



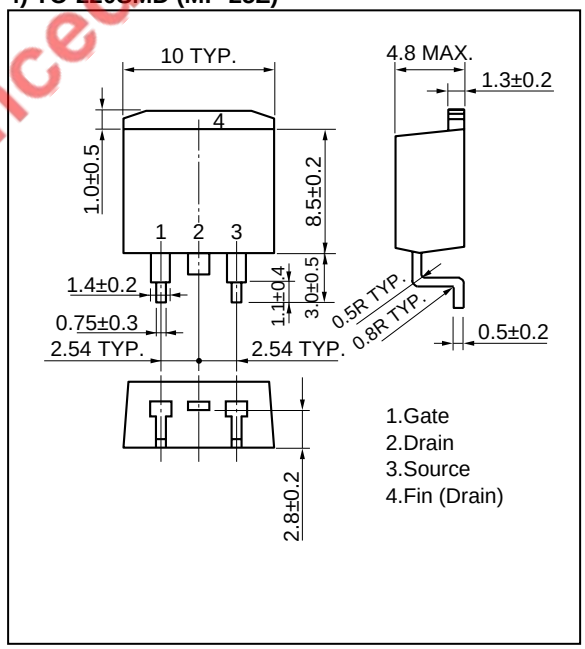
2) TO-262 (MP-25 Fin Cut)



3) TO-263 (MP-25ZJ)



4) TO-220SMD (MP-25Z)[Note]



Note This package is produced only in Japan.

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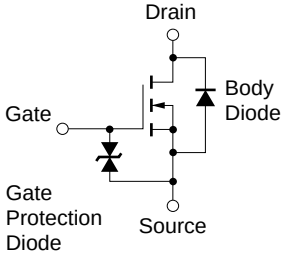
EQUIVALENT CIRCUIT



Remark The diode connected between the gate and source of the transistor serves as a protector against ESD. When this device actually used, an additional protection circuit is externally required if a voltage exceeding the rated voltage may be applied to this device.

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